

REMARKS

Applicants appreciate the Examiner's thorough consideration provided the present application. Claims 1-21 are now present in the application. Claims 20 and 21 have been added. Claims 1 and 10 are independent. Reconsideration of this application, as amended, is respectfully requested.

Claim Rejections Under 35 U.S.C. § 103

Claims 1-19 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Bares, U.S. Patent Application Publication No. US 2002/0075491, in view of Smilansky, U.S. Patent Application Publication No. US 2002/0102013. This rejection is respectfully traversed.

A complete discussion of the Examiner's rejection is set forth in the Office Action, and is not being repeated here.

Independent claim 1 recites a combination of steps including "analyzing pixel data representative of said pixelised image in a color space and based thereon, determining a gray axis defined as a straight line connecting a white point with a black point; determining for each pixel of said pixelised image a shortest distance to said gray axis; forming a cumulative histogram by plotting for the pixels of said pixelised image a value of said shortest distance versus a cumulative pixel count being the number of associated pixels having at least said value of said shortest distance; and analyzing a relationship between the pixels in said cumulative histogram and based thereon judging whether said pixelised image is to be processed as a monochrome image or a color image."

Independent claim 10 recites a combination of elements including “a pre-processor for analyzing pixel data representative of said pixelised image in a color space and based thereon determining a gray axis defined as a straight line connecting a white point with a black point, and determining for each pixel of said pixelised image the shortest distance to said gray axis; an analyzer for analyzing a relationship between the pixels of said pixelised image in a cumulative histogram, said cumulative histogram being formed by plotting for the pixels of said pixelised image a value of said shortest distance versus a cumulative pixel count being the number of associated pixels having at least said value of said shortest distance; and a judging unit for judging, based on said relationship between the pixels in said cumulative histogram, whether said pixelised image is to be processed as a monochrome image or a color image.”

Applicants respectfully submit that the above combinations of steps and elements as set forth in independent claims 1 and 10 are not disclosed or suggested by the references relied on by the Examiner.

The Examiner alleged that Bares in FIG. 2, step 84 and paragraph [0032] discloses “determining for each pixel of said pixelised image a shortest distance to said gray axis” as recited in claims 1 and 10. Applicants respectfully disagree. In particular, Bares in paragraph [0032] discloses:

Respective distances of each of the averaged (reduced) pixels from the neutral axis 22 are determined in the step 84. Then, the number of the distances exceeding a color threshold $T_n(L^*)$, which is determined as a function of a position along the neutral axis, is determined in a step 86. (Emphasis added.)

Bares also defines the “reduced pixel” in paragraph [0030] as follows:

The image 52 is reduced in a step 80 by a predetermined size of a pixel filter. For example, the filter may be sized to include two (2) pixels in the fast-scan direction and three (3) pixels in the slow-scan direction. By reduction is

meant a process by which blocks (sub-groups) of the current (intermediate) pixels are averaged. More specifically, if the filter is sized as 2x3 pixels, the components of the six (6) pixels in the filter are averaged independently of each other. For example, all six (6) of the a* values are averaged, all six (6) of the b* values are averaged, and all six (6) of the L* values are averaged to produce a reduced image pixel with components L^*_{avg} , a^*_{avg} , b^*_{avg} . It should also be understood that in this example the number of pixels in the reduced image is only one sixth compared to the original image. (Emphasis added.)

In other words, although Bares discloses determining a distance from the “reduced pixel” to the neutral axis 22, this reduced pixel is simply obtained by *averaging* the L* values, the a* values and b* values of a plurality of pixels (e.g., six (6) pixels in Bares). Therefore, Bares merely discloses determining a distance from the “reduced pixel” to the neutral axis 22, not determining a distance from each of the pixels of the image to the neutral axis 22. For example, none of the distances from of the six pixels (used to obtain the reduced pixel) of the image are determined in Bares. Therefore, Bares fails to teach “determining for each pixel of said pixelised image a shortest distance to said gray axis” as recited in claims 1 and 10.

The Examiner also alleged that Bares’ teaching in paragraph [0009] related to forming a cumulative histogram as recited in claims 1 and 10. Again, Applicants respectfully disagree. In particular, Bares in paragraph [0009] discloses:

In accordance with another aspect of the invention, the pixels are classified by determining a count of the reduced image pixels having values above a color threshold and classifying the image as one of color and neutral as a function of the count. (Emphasis added)

In other words, Bares merely discloses to count a number of colored pixels, wherein the colored pixels are defined as having a distance from a gray axis in a particular color space larger than a predetermined distance. Therefore, Bares suggests that the pixels having only a little color

content may be regarded as gray pixels. Such a method is known in the art as acknowledged in paragraph [0008] of the present application.

In addition, the term “count” is only for the “reduced image pixels”, not for the pixels of the image for the reasons stated above. Only the “reduced image pixels” that have values above a color threshold will be counted as color pixels (see also paragraph [0033]). Therefore, all Bares teaches is simply a final “number” (*i.e.*, the number of color pixels) for an image. In other words, this final number is a *single point* in a histogram. Unlike Bares, in the present invention, the *cumulative histogram* is not just a single point, but a plot/relationship presented by a series of values of the shortest distances and the corresponding *cumulative* pixel counts (*i.e.*, a cumulative histogram presented in a distance-versus-cumulative pixel count manner). Since Bares’ count is at most a single point in a histogram, Bares’ count cannot be presented by a series of values of the shortest distances and the corresponding *cumulative* pixel counts to show the above-noted relationship, not to mention the fact that the count is for “reduced pixels”, not for the pixels of the image. Therefore, Bares fails to teach “forming a cumulative histogram by plotting for the pixels of said pixelised image a value of said shortest distance versus a cumulative pixel count being the number of associated pixels having at least said value of said shortest distance” as recited in claim 1, and “said cumulative histogram being formed by plotting for the pixels of said pixelised image a value of said shortest distance versus a cumulative pixel count being the number of associated pixels having at least said value of said shortest distance” as recited in claim 10.

The Examiner also states that Shishizuka (U.S. Patent No. 5,786,906) in FIG. 17 discloses utilization of a histogram and alleged that one skilled in the art would have the

motivation to modify Bared in view Shishizuka's count histogram to achieve the cumulative histogram of the claimed invention. Again, Applicants respectfully disagree. In particular, Shishizuka in col. 15, lines 60-67 discloses:

R, G, and B data are input in units of pixels (S401) and are converted into a^* and b^* data by the XYZ→ a^*b^* conversion unit 411 (S403). A sum $(a^*)^2 + (b^*)^2$ is calculated by the multipliers 412 and 413 and the adder 414, and normalization of the sum is performed (S404). A frequency is then counted (S405). This processing is performed for all predetermined pixels (S406), and a maximum frequency M and a corresponding saturation value S are detected (S407)... (Emphasis added.)

In other words, Shishizuka's "count histogram" in step S405 is simply to count a *frequency of the saturation histogram*, and has nothing to do with a count of "reduce pixels" or the actual pixels of the image. Therefore, one skilled in the art would not have the motivation to modify Bares' count of "reduce pixels" in view of the *irrelevant* counted frequency of the saturation histogram in Shishizuka.

With regard to the Examiner's reliance on Smilansky, this reference has only been relied on for its teachings related to a liner regression analysis. This reference also fails to disclose the above combinations of elements as set forth in independent claims 1 and 10. Accordingly, this reference also fails to cure the deficiencies of Bares.

Accordingly, none of the utilized references individually or in combination teach or suggest the limitations of independent claims 1 and 10. Therefore, Applicants respectfully submit that independent claims 1 and 10 clearly define over the teachings of the utilized references.

In addition, claims 2-9 and 11-19 depend, either directly or indirectly, from independent claims 1 and 10, and are therefore allowable based on their respective dependence from independent claims 1 and 10, which are believed to be allowable.

In view of the above remarks, Applicants respectfully submit that claims 1-19 clearly define the present invention over the references relied on by the Examiner. Accordingly, reconsideration and withdrawal of the rejection under 35 U.S.C. § 103 are respectfully requested.

Response to the Examiner's Arguments in the Advisory Action

The Examiner in the Advisory Action dated April 29, 2008 alleged that the claims do not require the pixels to be either fake or real. However, as mentioned above, Bares merely discloses determining a distance from the "reduced pixel" to the neutral axis 22, not from each of the pixels of the image to the neutral axis 2. In fact, none of the distances from of the six pixels (used to obtain the reduced pixel) of the image are determined in Bares. If the Examiner takes the position that both the fake pixels (i.e., the reduced pixels) and the real pixels are the pixels of the image, then Bares at least fails to teach determining a distance from the real pixels of the image, and therefore fails to teach "determining for each pixel of said pixelised image a shortest distance to said gray axis" as recited in claims 1 and 10.

The Examiner in the Advisory Action dated April 29, 2008 also alleged that it is common in the art to use a histogram and that the skilled person would comprehend and implement the method according to the present application based on Bares' teaching "classifying the image as one of color and neutral as a function of count in a form of histogram." Applicants respectfully submit that the Examiner did not fully comprehend the present invention and its contribution to

the art, because in the present invention the count alone cannot determine the classification of an image. Instead, the present invention uses a count to construct a histogram. Then, based on a shape of the histogram (see e.g., Figs. 3c, 4b, 5c, and 6c), i.e., based on “*a relationship between the pixels in said cumulative histogram*” as recited in claims 1 and 10, the classification is performed. This claimed feature is clearly absent from the utilized references.

Additional Claims

Claims 20 and 21 have been added for the Examiner’s consideration. Applicants respectfully submit that claims 20 and 21 depend, either directly or indirectly, from independent claims 1 and 10, and are therefore allowable based on their respective dependence from independent claims 1 and 10, which are believed to be allowable. Favorable consideration and allowance of claims 20 and 21 are respectfully requested.

Additional Cited References

Since the remaining patents cited by the Examiner have not been utilized to reject the claims, but rather to merely show the state of the art, no further comments are necessary with respect thereto.

CONCLUSION

All the stated grounds of rejection have been properly traversed and/or rendered moot. Applicants therefore respectfully request that the Examiner reconsider all presently pending rejections and that they be withdrawn.

It is believed that a full and complete response has been made to the Office Action, and that as such, the Examiner is respectfully requested to send the application to Issue.

In the event there are any matters remaining in this application, the Examiner is invited to contact the undersigned at (703) 205-8000 in the Washington, D.C. area.

Pursuant to 37 C.F.R. §§ 1.17 and 1.136(a), Applicants respectfully petition for a two (2) month extension of time for filing a response in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§1.16 or 1.17; particularly, extension of time fees.

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Respectfully submitted,

By 

Paul C. Lewis

Registration No.: 43,368

BIRCH, STEWART, KOLASCH & BIRCH, LLP

8110 Gatehouse Road

Suite 100 East

P.O. Box 747

Falls Church, Virginia 22040-0747

(703) 205-8000

Attorney for Applicant
